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PATENT SPECIFICATION



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PROVISIONAL SPECIFICATION.

Improvements in Rotary Web Offset Printing Machines.

We, LINOTYPE AND MACHINERY LIMITED, of 9, Kingsway, London, W.C. 2, a British company, and BENJAMIN JOSEPH JOHN GOULDING, of Linotype and Machinery Works, Altrincham, in the County of Chester, a British subject, do hereby declare the nature of this invention to be as follows:

This invention relates to rotary web offset printing machines and has for its object to provide a new or improved construction whereby adjustments of a transfer cylinder relatively to the co-operating forme cylinder or forme cylinders, or forme cylinder and companion transfer cylinder can be readily effected without shifting of the forme cylinder or forme cylinders.

The invention comprises a transfer cylinder so arranged as to be adjustable relatively to the respective forme cylinder both angularly about the axis of the last named cylinder and radially towards and away from that axis.

The invention is applicable to machines for perfecting printing by either offset on both sides of a web, or offset on one side and direct printing on the other side, or for single side printing by offset.

In a constructional form of the invention adapted for offset printing on both sides of the web, the two forme cylinders are rotatable about fixed axes about which there are angularly adjustable respectively different pairs of radius bars each such pair rotatably supporting a transfer cylinder with a capacity for adjustment radially of the respective forme cylinder.

For attaining the aforesaid angular adjustment, the swinging end of each of the radius bars is attached to the machine frame, by, for example, a turnbuckle pivoted to said bar and frame, and said bar is capable of being rigidly secured in any adjusted position, by, for example clamping bolts screwing into the machine

frame and penetrating arcual slots in the radius bar.

For attaining the aforesaid radial adjustment of the transfer cylinders, the bearing blocks of the latter are slidably mounted in slots in the radius bars and are adjustable in these slots by set screws threaded into the said bars and adapted to bear on respectively opposite sides of the bearing blocks.

With an arrangement such as the foregoing, the two transfer cylinders, without disturbance of their operative relationship with the forme cylinders, can be adjusted relatively to each other as might be called for, for printing on webs of varying thickness, by releasing the clamping bolts, adjusting the turnbuckles and again tightening the clamping bolts. Further, the said transfer cylinders can be adjusted relatively both to each other and to the respective forme cylinders by carrying out the just described procedure and in addition turning the before mentioned set screws, thus permitting the adjustments called for by increases in the thickness of the rubber blankets on the transfer cylinders, such as occur after the offset printing has been carried on for a time.

To provide for the tripping of the transfer cylinders, the shafts of these latter are journalled in eccentric bushes which are angularly adjustable in the beforementioned bearing blocks, said bushes being turned by the operator through lever-and-link devices preferably so devised as to lock the transfer cylinders in their operative positions.

If desired, the angular adjustment of each pair of radius bars, instead of being effected by independently adjustable turnbuckles at respectively opposite ends of the respective transfer cylinder, as previously explained, may be effected by the simultaneous actuation of both of the turnbuckles appertaining to said cylin-

der, for which purpose these two turnbuckles would be operatively connected together preferably in such manner as to permit of their simultaneous operation 5 for coarse adjustment and independent operation for fine adjustment.

Dated this 12th day of July, 1923.

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COMPLETE SPECIFICATION.

Improvements in Rotary Web Offset Printing Machines.

We, LINOTYPE AND MACHINERY LIMITED, of 9, Kingsway, London, W.C. 2, a British company, and BENJAMIN JOSEPH JOHN GOULDING, of Linotype and Machinery Works, Altringham, in the County of Chester, a British subject, do hereby declare the nature of this invention and in what manner the same is to 20 be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to rotary web offset printing machines and has for its 25 object to provide a new or improved construction whereby adjustments of a transfer cylinder relatively to the co-operating forme cylinder or forme cylinders, or forme cylinder and companion transfer cylinder can be readily effected without shifting of the forme cylinder or forme cylinders.

The invention comprises a transfer cylinder so arranged as to be adjustable 35 relatively to the respective forme cylinder both angularly about the axis of the last named cylinder and radially towards and away from that axis.

The invention is applicable to machines 40 for perfecting printing by either offset on both sides of a web, or offset on one side and direct printing on the other side, or for single side printing by offset.

The invention will now be described by 45 reference to the accompanying drawings in which:—

Figure 1 is a side elevation of one constructional form adapted for offset printing on both sides of the web, only such 50 parts of the machine being represented as are considered pertinent;

Figure 2 is an elevation as viewed from the right-hand side of Figure 1;

Figure 3 is a side elevation, and Figure 55 4 a view as seen from the right-hand side of Figure 3, showing alternative means for adjusting a transfer cylinder transversely of its axis;

The same reference numerals are used 60 to indicate like or corresponding parts in the different arrangements illustrated in the drawings.

In the constructional form represented in Figures 1 and 2 there are provided two 65 forme cylinders 1, the shafts or trunnions 2 of which rotate about stationary axes in

the two side frames 3 of the machine; of these two side frames only that on the near or so-called plain, side of the machine is represented.

On extensions of the shafts 2 or, it may be, on separate stub shafts co-axial with those shafts, there are angularly adjustable different pairs of radius bars 4, the individual members of each pair being located at respectively opposite sides of the machine. Each of these pairs of radius bars 4 rotatably supports a transfer cylinder 5 with a capacity for adjustment radially of the respective forme cylinder 1.

For attaining the aforesaid angular adjustment of the radius bars 4, the swinging end of each of the latter is attached to the respective machine frame 3 by a turnbuckle 6 pivoted at its respectively opposite ends to the said radius bar and machine frame. For enabling the radius bars 4 to be secured in any such adjusted position, they are formed with arcual slots 7 through each of which passes a bolt 8 threaded into the respectively adjacent machine frame 3, so that by tightening these bolts, the radius bars can be clamped hard against the said machine frames.

For attaining the aforesaid radial adjustment of the transfer cylinders 5 relatively to the forme cylinders 1, the bearing blocks 9 of the former are slidably mounted in slots 10 in the radius bars 4 and are adjustable in these slots by set screws 11 threaded into the said bars, and the heads of which are adapted to bear on respectively opposite sides of the bearing blocks.

With an arrangement such as the foregoing, the two transfer cylinders 5, without disturbance of their operative relationship with the forme cylinders 1, can be adjusted relatively to each other as might be called for for printing on webs of varying thickness, by releasing the clamping bolts 8, adjusting the turnbuckle 6, and again tightening the said bolts 8. Further, the said transfer cylinders 5 can be adjusted relatively both to each other and to the forme cylinders 1, by carrying out the just described procedure and, in addition, turning the set screw 11, thus permitting the making of

adjustments such as might be called for by increases in the thickness of the rubber blankets 12 on the transfer cylinders 5, after the offset printing has been carried on for a time.

To provide for the tripping of the transfer cylinders 5, the shafts 13 of these latter, are journalled in eccentric bushes 14 which are angularly adjustable in the before-described bearing blocks 9, said bushes being turned by the operator through lever-and-link devices such as those next described.

In the arrangement for the just-named purpose, represented in Figure 1, each of the eccentric bushes 14 is provided with an outstanding arm 15 to which is pivoted by a pin 16 the upper end of a link 17 whose lower end, by a pin 18, is similarly pivoted to a downwardly-extending crank arm 19 fast to a rock shaft 20 journalled in the two side frames 3. On each of the two rock shafts 20 there is secured an arm 21 to which is pivoted one end of a link 22 the opposite ends of these links being pivotally connected one to the upper, and the other to the lower, arm of a two-armed lever 23. This lever 23 is rigidly secured to a shaft 24, journalled in the adjacent machine frame 3 (or in both of the frames 3) and having fast thereon a hand lever 25 whereby, through the just-described lever-and-link devices, the two eccentric bushes 14 can be turned into their terminal positions to trip or untrip the two transfer cylinders 5 simultaneously.

In Figure 1 the transfer cylinders 5 are shown in printing relationship and in this connection it will be observed that at that juncture, the axis of the pivot pins 16, 18, are aligned with the axis of the respective rock shaft 20, or the axis of the pin 18 may have been moved just beyond the dead centre position, so that there is no tendency for the transfer cylinders to move accidentally out of the said printing relationship. Adjustable stops 26 are provided for preventing the transfer cylinders 5 from being forced together with too great pressure.

It will be observed that, by reason of the arms 15 being as it were, anchored to the upper ends of the links 17, any angular movement of the radius bars 4 about the axes of the trunnions 2, or radial movement of the transfer cylinders 5 relatively to the forme cylinders 1, will effect slight rotation of the eccentric bushes 14 and consequently be causative of disturbance in the relationship of the transfer cylinders 5 to the forme cylinders 1. To avoid any such disturbance, each of the bushes has formed in it a hole 27, adapted to receive a locating pin (not shown in the drawing) and to register with a similar hole in the respective bearing block 9

when the parts are in normal adjustment so that the pin by engaging with both of these co-axial holes will serve temporarily to lock the bush 14 to the block 9. The pivot pin 16 is also arranged so as to be readily removable from the arm 15 and link 17 and before an adjustment of a transfer cylinder 5 has to be made, the locking pin is inserted into the then registering holes of the respective bush 14 and block 9, and the pivot pin 16 is withdrawn from the arm 15 and link 17. The desired adjustment of the cylinder 5 is then effected by the previously described means, and after that, the length of the link 17 may be adjusted to bring the hole at the upper end of the latter into register with that in the arm 15, by rotating a turnbuckle 28, forming part of said link, whereupon the pin 16 may be re-inserted in the arm 15 and link 17, and the locking pin removed from the hole 27. The turnbuckles 28 normally are fixed on the links 17 by lock nuts 29 which are released before the said turnbuckles can be adjusted.

If desired, the angular adjustment of each pair of radius bars 4, instead of being effected by independently adjustable turnbuckles at respectively opposite ends of the respective transfer cylinder 5, as represented in Figures 1 and 2, may be effected by the simultaneous actuation of both of the turnbuckles appertaining to said cylinder; for this purpose the two turnbuckles 6 would be operatively connected together preferably by means such as are next described with reference to Figures 3 and 4, which will permit of their simultaneous operation for coarse adjustment and independent operation for fine adjustment.

In the just-named arrangement, each of the turnbuckles has fast to, or integral with, it, a helical gear 30 which meshes with a similar gear 31 or 32, both mounted on the same horizontal shaft 33, the former fixedly and the latter with a capacity for angular adjustment thereon. The shaft 33 is rotatably supported in bearings in the two side frames 3, and has one of its ends formed with a square 34 for enabling it to be rotated by a crank handle applied to this squared end, while, on the other end of the shaft there is rigidly secured a collar 35 having a semi-circular slot 36 (shown in dotted lines in Figure 3) through which extends a bolt 37 threaded into the helical gear 32 which latter, but for the said bolt, would be free to rotate independently of the shaft 33.

When, with the just described devices, it is desired to effect a coarse adjustment of a transfer cylinder 5 angularly and uniformly at both ends of the cylin-

der, about the axis of the respective forme cylinder 1, this is effected by rotating the shaft 33 so as to turn both of the turnbuckles 6 appertaining to that shaft, 5 simultaneously and uniformly, when, on the other hand, it is desired to slightly raise or lower the transfer cylinder at one end only, this may be effected by releasing the bolt 37 (which normally is 10 screwed up tight) and turning the shaft 33 to any extent within the limits determined by the slot 36, and after such adjustment again tightening the bolt 37.

Although only the turnbuckles 28 have 15 been herein described as provided with lock nuts 29, it will be observed that the drawings show that in the preferred arrangement, all of the other turnbuckles included in the constructions 20 illustrated, are provided with similar devices.

It is to be understood that the before described constructional forms are given merely as convenient examples and that 25 they are susceptible of various modifications without departing from the essential features of the invention, for instance as will be obvious, instead of the different eccentric bushes 14 in Figure 1 being all linked together so as to be actuated by a single hand lever 25, which is the preferred arrangement, the bushes 14 appertaining to the different transfer cylinders 5, may be provided with independently 30 operable adjusting devices.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we 40 claim is:—

1. In a rotary web offset printing machine, the combination with a printing couple and a forme cylinder contacting with one member of the couple, of means 45 whereby that member can be adjusted angularly about the axis of the forme cylinder without varying the pressure between said member and forme cylinder and in any position attained by such 50 adjustment radially towards and away from the said axis to vary such pressure.

2. In a rotary web offset printing machine, means according to Claim 1, characterised by a radius bar angularly 55 adjustable about the axis of the forme cylinder and in which the adjustable member of the printing couple is rotatably supported with a capacity for radial adjustment relatively to the said forme 60 cylinder.

3. In a rotary web offset printing machine, the combination with a printing couple comprising two transfer cylinders and a forme cylinder contacting

with each transfer cylinder, of a pair of radius bars rotatably supporting each of said transfer cylinders and angularly adjustable about the axis of each of the forme cylinders to vary the pressure between the transfer cylinders without disturbing the forme cylinders, and means whereby the pressure between each transfer cylinder and the forme cylinder contacting therewith can be adjusted without disturbing the latter cylinder. 65

4. In a rotary web offset printing machine, means according to Claim 3, characterised by devices whereby angular movement of both of the transfer cylinders about the axes of their respective forme cylinders can be effected simultaneously. 70

5. In a rotary web offset printing machine, means according to Claim 1, characterised by devices whereby the angularly adjustable member of the printing couple can alternatively be adjusted at both ends simultaneously or at both ends independently. 75

6. In a rotary web offset printing machine, the combination with means according to Claim 1, of devices adapted to lock the adjustable member of the printing couple against radial movement relatively to the forme cylinder during 90 the time at which that member is being adjusted angularly about the axis of said forme cylinder. 95

7. In a rotary web offset printing machine, means according to Claim 1 100 wherein the movement of the adjustable member radially relatively to the forme cylinder, is effected by turning an eccentric bearing in which that member is supported, said turning being effected by 105 lever-and-link mechanism, characterised by means whereby the eccentric bearing can be disconnected from the lever-and-link mechanism and means adapted to prevent it from rotating about its own axis when so disconnected. 110

8. In a rotary web offset printing machine, the combination with a radius bar according to Claim 2, of clamping means for securing it in its various positions of adjustment. 115

9. In a rotary web offset printing machine, cylinder adjusting mechanism constructed and arranged substantially as hereinbefore described with reference to Figures 1 and 2, or Figures 1, 2, 3 and 4 120 of the accompanying drawings.

Dated this 14th day of April, 1924.

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221,047 COMPLETE SPECIFICATION

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[This Drawing is a reproduction of the Original on a reduced scale]

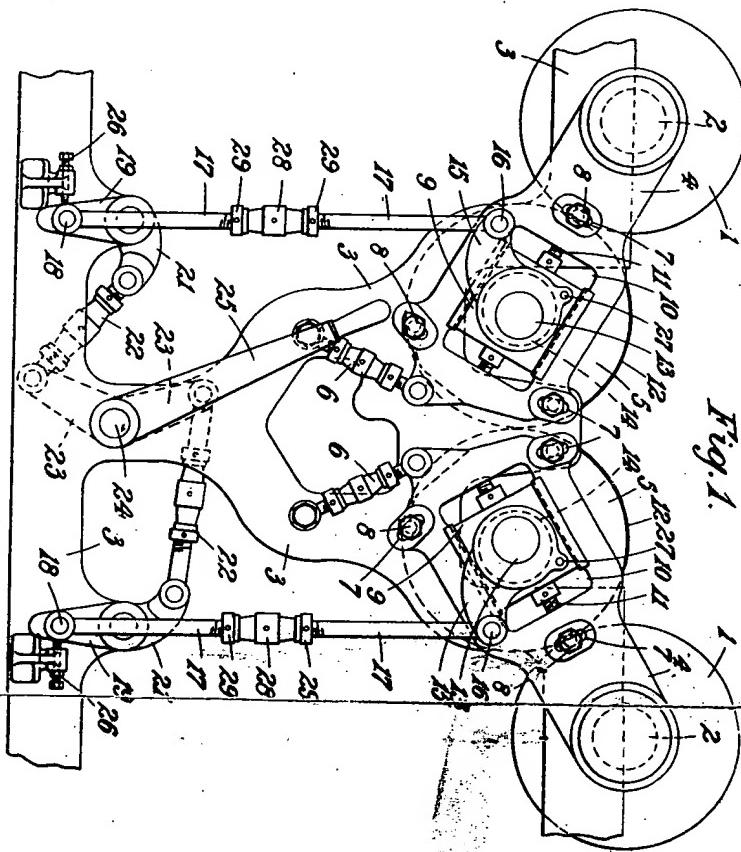


Fig. 1.

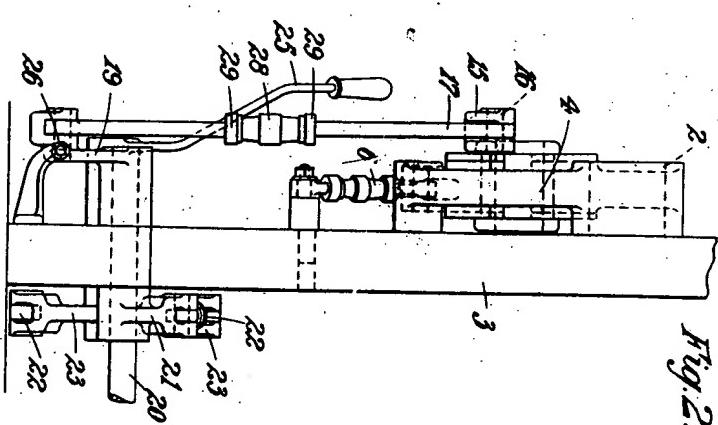


Fig. 2.

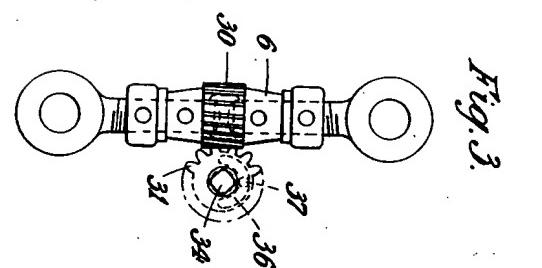


Fig. 3.

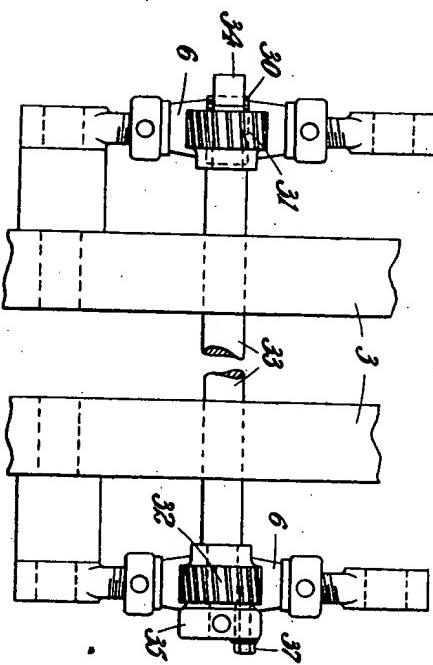


Fig. 4.